2/28/18 "A mistake is food for a new invention." -Anonymous

HW: "Domain and Range" w/s Worksheet #1
Test 2 on Friday 3/9

AIM: What are the domain and range of functions?

Warm Up:

Describing #s

The roots of the equation $ax^2 + 4x = -2$ are real, rational, and equal when a has a value of

(1) 1
(2) 2
(3) 3
(4) 4

Discriminant is equal to 0.

$b^2 - 4ac = 0$

$ax^2 + 4x + 2 = 0$

$a = a$
$b = 4$
$c = 2$

$4^2 - 4a(2) = 0$

$16 - 8a = 0$

$\frac{-8a}{-8} = \frac{-16}{-8}$

$a = 2$

FUNCTION NOTATION

COMMON CORE ALGEBRA II HOMEWORK

FLUENCY

1. Without using your calculator, evaluate each of the following given the function definitions and input values.

(a) $f(x)=3x+7$ (b) $g(x)=3x^2$ (c) $h(x)=\sqrt{x-5}$

$f(-4)=$ $3(-4)+7=-12+7=-5$ $g(2)=$ $3(2)^2=3(4)=12$ $h(41)=$ $\sqrt{41-5}=\sqrt{36}=6$

$f(2)=$ $3(2)+7=6+7=13$ $g(-3)=$ $3(-3)^2=3(9)=27$ $h(14)=$ $\sqrt{14-5}=\sqrt{9}=3$

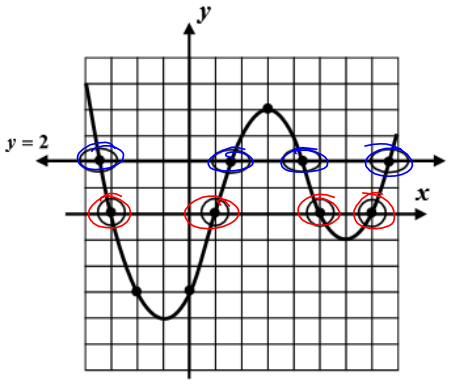
2. Using **STORE** on your calculator, evaluate each of the following more complex functions.

(a) $f(x)=\dfrac{3x^2-5}{4x+10}$ (b) $g(x)=\dfrac{\sqrt{25-x^2}}{x}$ (c) $h(x)=30(1.2)^x$

$f(-5)=$ -7 $g(4)=$ 0.75 or $\frac{3}{4}$ $h(3)=$ 51.84

$f(0)=$ -0.5 or $-\frac{1}{2}$ $g(-3)=$ $-1.\overline{3}$ or $-\frac{4}{3}$ $h(0)=$ 30

3. Based on the graph of the function $y=g(x)$ shown below, answer the following questions.



(a) Evaluate $g(-2), g(0), g(3)$ and $g(7)$.

$g(-2)=-3$
$g(0)=-3$
$g(3)=4$
$g(7)=0$

(b) What values of x solve the equation $g(x)=0$

$\{-3, 1, 5, 7\}$ Shown circled on the graph.

(c) Graph the horizontal line $y=2$ on the grid above and label.

(d) How many values of x solve the equation $g(x)=2$?

There are four solutions to this equation. They would be the x-coordinates of the intersection points enclosed in the diagram above using ovals/ellipses.

APPLICATIONS

4. Ian invested \$2500 in an investment vehicle that is guaranteed to earn 4% interest compounded yearly. The amount of money, A, in his account as a function of the number of years, t, since creating the account is given by the equation $A(t) = 2500(1.04)^t$.

(a) Evaluate $A(0)$ and $A(10)$.

$A(0) = 2500(1.04)^0 = 2500$

$A(10) = 2500(1.04)^{10} = 3700.61$

(b) What do the two values that you found in part (a) represent?

$A(0)$ represents the initial amount invested

$A(10)$ represents the amount after 10 years

(c) Using tables on your calculator, determine, to the nearest whole year, the value of t that solves the equation $A(t) = 5000$. Justify your answer with numerical evidence.

$Y = 2500(1.04)^X$

x	y
17.5	4966.2
17.6	4985.7
17.7	5005.3
17.8	5025.0

18 years

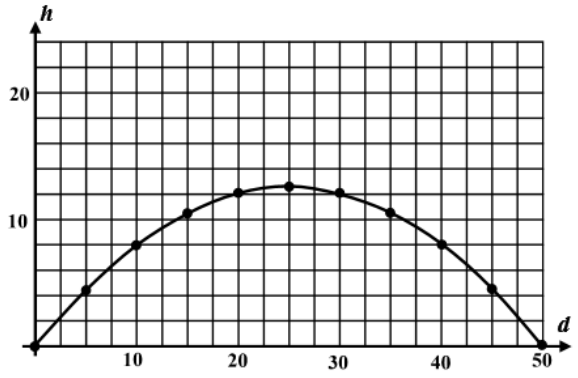
(d) What does the value of t that you found in part (b) represent about Ian's investment?

This indicates that it takes approximately 18 years for Ian's investment to double in value.

5. A ball is shot from an air-cannon at an angle of 45° with the horizon. It travels along a path given by the equation $h(d) = -\frac{1}{50}d^2 + d$, where h represents the ball's height above the ground and d represents the distance the ball has traveled horizontally. Using your calculator to generate a table of values, graph this function for all values of d on the interval $0 \le d \le 50$. Look at the table to properly scale the y-axis.

What is the maximum height that the ball reaches? At what value of d does it reach this height?

The maximum height is 12.5 which is reached at a d value of 25.



Domain of a function:

All of the possible x-values (inputs) (independent variable)

* On a graph look left to right.

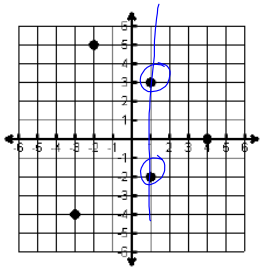
Range of a function:

All of the possible y-values (outputs) (dependent variable)

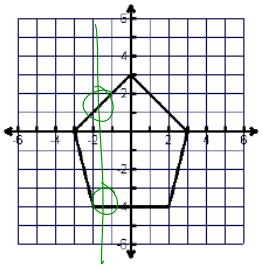
* Graphically look from bottom to top.

State the domain and range for each graph and then tell if the graph is a function (write yes or no).

1) Domain $-3, -2, 1, 4$
Range $-4, -2, 0, 3, 5$
Function? NO

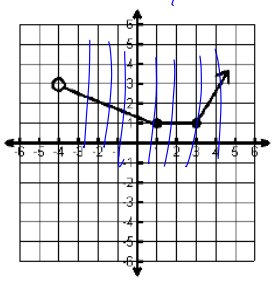


2) Domain $[-3, 3]$ or $-3 \leq x \leq 3$
Range $[-4, 3]$ or $-4 \leq y \leq 3$
Function? NO

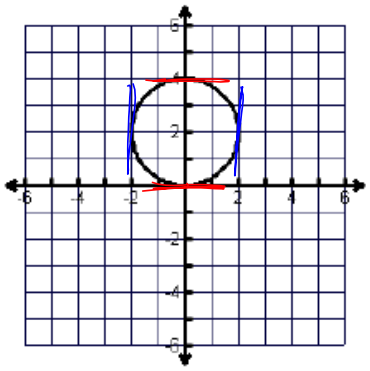


Fails VLT

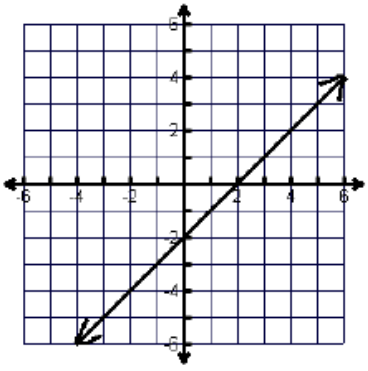
3) Domain $(-4, \infty)$
Range $[1, \infty)$
Function? yes



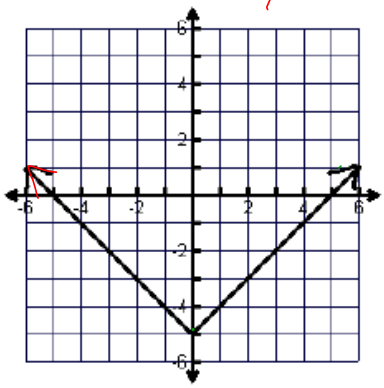
4) Domain [-2, 2]
Range [0, 4]
Function? NO!!



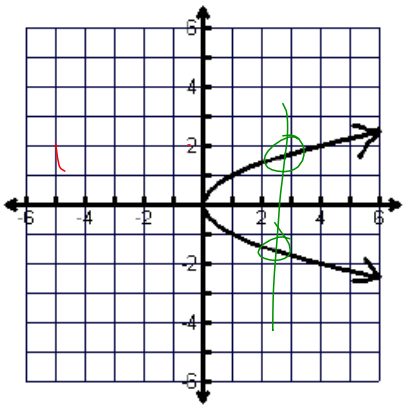
5) Domain $(-\infty, \infty)$
Range $(-\infty, \infty)$
Function? yes



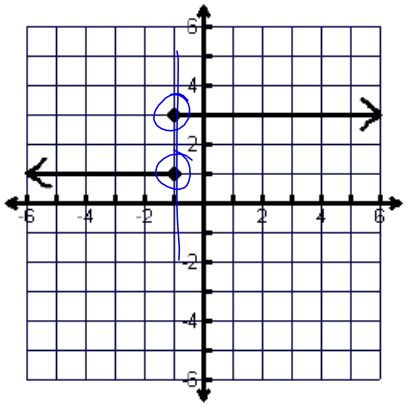
6) Domain $(-\infty, \infty)$
Range $[-5, \infty)$
Function? yes



7) Domain $[0, \infty)$
Range $(-\infty, \infty)$
Function? NO



8) Domain $(-\infty, \infty)$
Range $1, 3$
Function? NO



9) Domain $(-\infty, -3) \cup (-3, 2)$
Range $[-2, \infty)$
Function? yes